

**ABSTRACT OF THE DISCLOSURE**

Methods and apparatus for depositing low dielectric constant layers that are resistant to oxygen diffusion and have low oxygen contents are provided. The layers may be formed by exposing a low dielectric constant layer to a plasma of an inert gas to densify the low dielectric constant layer, by exposing the low dielectric constant layer to a nitrating plasma to form a passivating nitride surface on the layer, or by depositing a thin passivating layer on the low dielectric constant layer to reduce oxygen diffusion therein. The low dielectric constant layer may be deposited and treated *in situ*.